

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 38952	FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small>	
International application No. PCT/IB 00/ 00985	International filing date (day/month/year) 19/07/2000	(Earliest) Priority Date (day/month/year) 09/09/1999
Applicant ORBOTECH - SCHUH GMBH & CO. KG. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

2



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

/IB 00/00985

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G01R31/309 G01N21/88

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01R G01N H05K H01L H04N G01B G01V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 871 027 A (HEWLETT PACKARD CO) 14 October 1998 (1998-10-14) column 5, line 5 - line 49 figures 1-3	1-5
A	US 5 249 349 A (KUINOSE MASAJI ET AL) 5 October 1993 (1993-10-05) column 10, line 4 - line 41 figures 16,24,27,28	1,2
A	US 5 801 824 A (HENLEY FRANCOIS J) 1 September 1998 (1998-09-01) figure 7 column 9, line 26 - line 54	6
	--- -/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

22 September 2000

Date of mailing of the international search report

29/09/2000

Name and mailing address of the ISA

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 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Verdoodt, E

INTERNATIONAL SEARCH REPORT

International Application No

/IB 00/00985

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 07 332 A (DIEHL GMBH & CO) 9 September 1993 (1993-09-09) column 1, line 37 - line 45 column 2, line 18 - line 42 column 3, line 11 - line 28 figures 2,4-6 ----	1
A	WO 99 31490 A (APPLIED MATERIALS INC) 24 June 1999 (1999-06-24) page 9, line 9 - line 18 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/IB 00/00985

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0871027	A	14-10-1998	US 6084663 A JP 10300448 A	04-07-2000 13-11-1998
US 5249349	A	05-10-1993	KR 9502211 B JP 2907246 B JP 5129800 A	14-03-1995 21-06-1999 25-05-1993
US 5801824	A	01-09-1998	NONE	
DE 4207332	A	09-09-1993	NONE	
WO 9931490	A	24-06-1999	NONE	

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 08 May 2001 (08.05.01)	
International application No. PCT/IB00/00985	Applicant's or agent's file reference 85/OR33K01/WO
International filing date (day/month/year) 19 July 2000 (19.07.00)	Priority date (day/month/year) 09 September 1999 (09.09.99)
Applicant SCHUH, Wolfgang	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

29 January 2001 (29.01.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Olivia TEFY Telephone No.: (41-22) 338.83.38
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(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number
WO 01/18555 A1

(51) International Patent Classification⁷: G01R 31/309, G01N 21/88

(21) International Application Number: PCT/IB00/00985

(22) International Filing Date: 19 July 2000 (19.07.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
131837 9 September 1999 (09.09.1999) IL

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): ORBOTECH - SCHUH GMBH & CO. KG. [DE/DE]; 12 Gutenbergstrasse, D-31812 Bad Pyrmont (DE).

Published:

— With international search report.

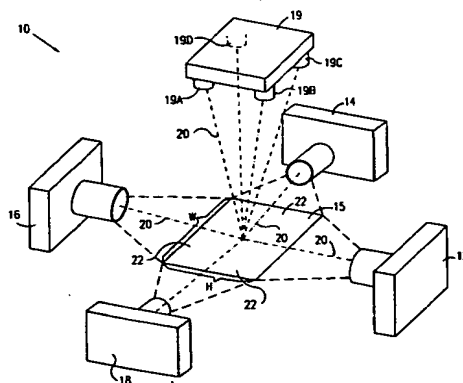
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): SCHUH, Wolfgang [DE/DE]; 34a Rathansstrasse, D-31812 Bad Pyrmont (DE).

(74) Agent: KUHLEN, Rainer, A.; Kuhnlen & Wacker Patentanwaltsgesellschaft mbH, Alois-Steinecker-Strasse 22, 85354 Freising (DE).

(54) Title: AUTOMATED OPTICAL INSPECTION SYSTEM WITH IMPROVED FIELD OF VIEW



(57) Abstract: An automated optical inspection system (10) including four CCD cameras (12, 14, 16, 18) spaced from each other and arranged generally north, east, south and west at an angle above a generally rectangular area (15) upon which an item to be inspected may be placed, wherein a width of the area (15) is larger than a height of the area (15), each of the cameras (12, 14, 16, 18) having an optical axis (20) and a field of view (22), the fields of view (22) of the cameras (12, 14, 16, 18) being generally rectangular, wherein a width of the field of view (22) is larger than a height of the field of view (22), characterized in that a pair of the cameras (12, 16) are positioned generally opposite each other, each having the width and height of their fields of view (22) generally in the same direction as the width and height of the area (15), respectively, and the other pair of the cameras (14, 18) are positioned generally opposite each other and generally perpendicular to the first-mentioned pair of cameras (12, 16), each having the width and height of their fields of view (22) generally in the same direction as the height and width of the area (15), respectively.

WO 01/18555 A1

INTERNATIONAL SEARCH REPORT

International Application No.

PO 00/00985

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01R31/309 G01N21/88

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01R G01N H05K H01L H04N G01B G01V

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

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	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

22 September 2000

Date of mailing of the international search report

29/09/2000

Name and mailing address of the ISA

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Authorized officer

Verdoodt, E

INTERNATIONAL SEARCH REPORT

Inter-
national Application No
PC 00/00985

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC 00/00985

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EP 0871027 A	14-10-1998	US 6084663 A JP 10300448 A	04-07-2000 13-11-1998
US 5249349 A	05-10-1993	KR 9502211 B JP 2907246 B JP 5129800 A	14-03-1995 21-06-1999 25-05-1993
US 5801824 A	01-09-1998	NONE	
DE 4207332 A	09-09-1993	NONE	
WO 9931490 A	24-06-1999	NONE	

RECD 07 DEC 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14

Applicant's or agent's file reference 85/OR33K01	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB00/00985	International filing date (day/month/year) 19/07/2000	Priority date (day/month/year) 09/09/1999
International Patent Classification (IPC) or national classification and IPC G01R31/309		
Applicant ORBOTECH - SCHUH GMBH & CO. KG. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 29/01/2001	Date of completion of this report 05.12.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer O'Callaghan, F Telephone No. +49 89 2399 6512 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB00/00985

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-3 as originally filed

Claims, No.:

1-6 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/IB00/00985

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims
	No:	Claims 1-6
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-6
Industrial applicability (IA)	Yes:	Claims 1-6
	No:	Claims

- 2. Citations and explanations**
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Citations:

D1: EP-A-0 871 027

D2: US-A-5 249 349

D3: US-A-5 801 824

Insofar as the set of claims can be understood (cf. paragraph VIII below) the following holds:

1. Claim 1: D1 discloses an automated optical inspection system which comprises four cameras 3, 4, 5, 6 spaced from each other and arranged generally north, east, south and west at an angle above a generally rectangular area (cf. col. 5, lines 25-34 and Figs. 1, 3), wherein the width of this area is larger than the length (cf. Fig. 3), each of said cameras 3, 4, 5, 6 having an optical axis (9) and a field of view 21-24. These fields of view are generally rectangular (cf. Fig. 3), the width being longer than the length.

D1 also discloses pairs of said cameras being positioned generally opposite each other (Fig. 1, reference signs 3, 4; 5, 6). One of said pairs of cameras has the **width and length** of their fields of view (cf. Fig. 3, reference signs 23 and 24) generally in the **same direction** as the **width and length** of said generally rectangular area (for example, area 20, which also corresponds to the field of view of the overhead fifth camera and to the area upon which the item to be inspected is placed) and the other pair of cameras, also being positioned generally opposite each other and generally perpendicular to the first-mentioned pair of cameras has the **width and length** of their fields of view (cf. Fig. 3, reference signs 21 and 22) generally in the **same direction** as the **length and width** of the area 20, respectively.

Thus, the solution defined in claim 1 is anticipated in D1 and thus claim 1, not defining novel subject-matter does not satisfy the requirements of Article 33(2) PCT.

2. Claims 2-5: The herein defined additional features are also anticipated in D1 (cf. Figs. 1, 2, 3, 7 and col. 7, lines 15-17).

3. Claim 6: The herein defined additional feature is well known in this technical field. For example, this feature is already employed in a similar arrangement in D3 (cf. Fig. 7 and col. 9, lines 27-32)

Thus, the set of claims, not defining new and inventive subject matter, does not satisfy the requirements of Articles 33(2) and (3) PCT.

Furthermore, D2 (cf. Fig. 27 and col. 11, lines 20-22) discloses four cameras in a similar inspection arrangement. Each of these cameras is mounted on a rotational axis which allows the field of view of the cameras to be adjusted as required. The combination of this teaching with the prior art cited on page 1 of the description would render the solution proposed by the present application (cf. Fig. 2) non-inventive.

Re Item VII

1. There is no document identified in the description which reflects the prior art described on page 1 (Rule 5.1(a)(ii) PCT).

Re Item VIII

1. In general, the use of the term 'height' when describing a horizontal area is confusing. Perhaps what is meant is 'length'.

2. The essential features, as seen in Fig. 2, that each field of view has the same area, being the same size as the area upon which items to be inspected are placed, that the fields of view of cameras situated opposite each other overlap (i.e. are one and the same), that the fields of views of both sets of opposing cameras overlap and that the area where the overlapping takes place is the generally rectangular area upon which items to be inspected are placed, are not present in claim 1.

Thus, claim 1, being unclear, does not not meet the requirements of Article 6 PCT.